PC 8957

Motor-Driven Pump Unit

The present invention relates to a motor-driven pump unit, in particular for antilock systems of motor vehicles, with the characteristics described in the preamble of Patent Claim 1.

A motor-driven pump unit of this type already is disclosed in EP 645 875 B1. It comprises an electric motor arranged on one side of a pump unit and an electronic unit arranged on another side of the pump unit. A commutator is mounted at the shaft end of the electric motor that faces away from the pump, and this commutator is acted upon by radially arranged carbon brushes. A supply line that runs through the motor and pump housing up to the electronic unit supplies power to these carbon brushes. The motor-driven pump unit can be improved, because measures have to be taken that the carbon brushes and the brush holding plate can be lowered radially to the commutator after mounting the rotor and the motor housing. For this reason, special tubular brush-holders for the carbon brushes have been proposed, with which the brushes would be held in a retracted position and could be pushed radially out of the tubular brush-holder in the direction of the commutator after a releasing device is activated. However, the tubular brush-holders are no longer accessible after the brush holding plate and motor housing have been mounted, and this is an added problem.

Another disadvantage is that the overall length of the unit increases in relation to the width of the commutator. Little mounting space and particularly a short overall length count among the basic requirements for a unit for motor vehicles.

Hence, the object of the present invention is to propose a motor-driven pump unit that can be assembled easily and requires only slight space in its assembled state. Furthermore, the contacting between the electrical components is to be simplified.

This object is solved on the basis of the characteristic features of Patent Claim 1 by providing means for an axially movable holding device and for the electric contacting of carbon brushes in connection with an axial installation of the unit. Due to the axially movable arrangement of the carbon brushes, it is no longer necessary to hold back the carbon brushes during certain installation steps on the one hand, and on the other hand the overall length of the entire unit is essentially rendered independent of the width of the commutator because, according to the invention, an axially effective commutator can be used. And, finally, the motor according to the invention does not require a brush holding plate.

Further embodiments of the invention are disclosed in subclaims in connection with the descriptions and drawing. In the following, the invention is described in detail on the basis of Figure 1, which shows a sectional view of a motor-driven pump unit according to the invention.

A motor-driven pump unit 1 is used especially for antilock systems in motor vehicles. It comprises an electric motor 2, which is mounted on one first side 3 of a pump unit 4 with a pump housing 5 and fastened thereto. An electronic unit 7 with a housing 8 is mounted on another second side 6 of the pump housing 5 and fastened thereto. The electronic unit 7 basically serves to activate electromagnetic valves (not shown) used for regulating the brake pressure in brake

circuits. The electric motor 2 has a pot-shaped housing 9. Inside the housing there is a motor shaft 10 with a rotor 11 that has an armature 12 and windings 13. An essentially disc-shaped commutator 14, which is resiliently acted upon in an axial direction by carbon brushes 15, 16, is mounted with torsional strength on the motor shaft 10. Its contact surface 14 is effective in an axial direction and extends at an right angle to a rotary axis 18 of the electric motor 2.

Means 19, 20 are provided for an axially movable holding device and contacting of the carbon brushes 15, 16 in connection with an axial installation of the unit. As shown in the drawing, the means 19, 20 are provided on the electronic unit 7, thus, together with the carbon brushes 15, 16, they form an electric constructional unit. The carbon brushes are located at the level of the pump housing 5, so that the electric motor 2 is shortened by the dimension of the carbon brushes 15, 16. Besides the carbon brushes 15, 16, no contacting of additional electric components of the electric motor 2 or the pump unit 4 is necessary. As means 19, 20 the electronic unit 7 has two guide elements 21, 22 for the carbon brushes 15, 16, which are effective parallel to the rotary axis 18. Each guide element 21, 22 is axially aligned to the commutator 14 and essentially comprises a box 23, 24 open towards the motor, which has a stop surface 25, 26 at the end. A pressure spring which resiliently prestresses the carbon brushes 15, 16 in the direction of the contact surface is arranged between the stop surfaces 25, 26 and the carbon brushes 15, 16.

It should be noted that the means 19, 20 can also be integrated in the pump housing 5 separately, i.e. independently of the electronic unit.

According to the embodiment shown in the drawing, the guide elements 21, 22 are arranged at the ends 30, 31 of protruding arms 32, 33, and the number of arms 32, 33 corresponds to the number of carbon brushes. The arms 32, 33 are arranged in a circular path concentrically to the motor shaft 10, and they essentially extend parallel to the axis of the motor shaft 10 in the direction of the commutator 14. As shown in the figure, the arms 32, 33 extend through holes 34, 35 of the pump housing 5 and have sealing elements 36, 37 which bear against the wall of the hole. It should be noted that conducting elements 38, 39, which serve to ensure the electric contacting of the carbon brushes 15, 16, run inside the arms 32, 33 and lead to electric connection elements in the vicinity of the electronic unit 7. Thus no separate electric connection is needed for the electric motor 2.

Basically the motor-driven pump unit is assembled as described below. In a first step the rotor 11, the motor shaft 10, the commutator 14 mounted with torsional strength on the motor shaft and the pushed on bearing elements 40, 41 are inserted axially in a location hole 42 of the pump housing 5, so that the bearing element 41 for the pump eccentric with its pot-shaped bottom lies against the bottom of the location hole 42. In a second step the housing of the electric motor 9 is axially pushed onto the free end of the motor shaft 10 and fastened to the pump unit 4. It would be advantageous if the pot-shaped bottom of the motor housing 9 had a corresponding cup for holding the support bearing 43. In a final step the electronic unit 7 is axially pushed onto the pump unit 4 in the direction of the motor 2, so that arms 32, 33 extend through the pump unit 4. Since the carbon brushes 15, 16 are arranged in an axially movable manner on the electronic unit 7, no measures are needed to retain them

in a retracted position, as would be the case in a radial arrangement of the carbon brushes.